

Materials Science

WORKING WITH A TEACHING VERSION OF A SCANNING TUNNELING MICROSCOPE

Zoë Z. Paukstys

Illinois State University
Physics Department
Campus Box 4560
Normal, IL. 61790-4560
USA
ghr@phy.ilstu.edu

Dr. Shang-Fen Ren*

When working with a Scanning Tunneling Microscope (STM), you are working with the forerunner in visualizing topographical views of surfaces. With a horizontal resolution of a few square angstroms and vertical resolution of less than one angstrom, everything that is seen with the STM is unique. Simply stated, the STM consists of a tip and a sample, both of which have to be conducting, inside of a vacuum where two conducting electrodes with an isolator create a vacuum gap barrier. This creates a tunneling effect, which in turn creates a current that varies on the separation distance between the tip and the sample. By participating in a summer research experience in Beijing, China, I learned the basics of a teaching version of STM. I was able to make tips of Tungsten (W) myself, mount, and replace them. I was also able to manually manipulate the current and the voltage to create high-resolution 'pictures' of materials. By taking part in this INT-REU program, not only was I able to work with amazing machinery and see its applications, I was able to see how the education system in China differs from that of the United States and how these differences affect the students.